THE MINERAL INDUSTRY OF BURMA

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Burma is located in Southeast Asia and is bordered by the countries of Bangladesh, China, India, Laos, and Thailand; the Andaman Sea; and the Bay of Bengal. This country has an area of 678,500 square kilometers (km²) and had an estimated population of 52.17 million in 2003 (no official census has been taken since 1983). A former colony of Great Britain, Burma achieved full independence in 1948 (U.S. Central Intelligence Agency, 2003§,[1] 2004§; U.S. Department of State, 2004§).

In 2003, Burma's gross domestic product (GDP) based on purchasing power parity was estimated to be $73 billion (International Monetary Fund, 2004§). Burma's economy is based primarily on agriculture, including fisheries, forestry, and livestock, which accounts for nearly 54% of the GDP. The country's mineral resources include antimony, coal, copper, gemstones, lead, limestone, marble, natural gas, petroleum, precious stones, tin, tungsten, and zinc. Burma's export market totaled about $2.6 billion during 2003 and included natural gas (23.3%), forest products (14.8%), garments (14.4%), beans (about 11.7%), marine products (6.8%), and other products (27%). Imports totaled about $2.4 billion and included machinery and transport equipment (20.2%), refined mineral oil (12.3%), base metals and manufactures (9.4%), fabrics (about 8.8%), plastic (4.6%), and other products (44.7) (U.S. Department of State, 2004§).

In 2003, Burma hosted the second annual meeting of the Joint Economic Quadrangle Committee in the capital city of Yangon. The meeting, which was attended by representatives of Burma's Federation of Chambers of Commerce and Industry and the counterpart organizations from China, Laos and Thailand, supported increased trade and investment in Burma from the neighboring countries of the Mekong region (Cambodia, China, Laos and Thailand). The committee's proposal to attract more trade and investment to the area included the promotion of commercial navigation in the upper Mekong region, reduction of trade barriers, simplification of border-crossing procedures, and support for projects that encourage alternatives to the growing of opium. Thailand, which was the third leading investor in Burma, invested $1.29 billion in Burma in 2002, and China, about $64 million. Burma's 2002 border trade with China was valued at $276 million, which was an increase of 35% compared with that of 2001. Trade with Thailand totaled $170 million in 2002 (Myint, 2003).

Major events in early 2003 that disrupted Burma's economy included a major banking crisis that shut down 20 private banks in the country, followed by a Japanese freeze on new bilateral economic aid. The decline in foreign investment that had taken place since 1999 continued owing to an unfriendly business climate, political pressure from Western consumers and shareholders, and the effect of U.S. economic sanctions on the country's economy (U.S. Central Intelligence Agency, 2004§; U.S. Department of State, 2004§).

U.S. relations with Burma have been strained since 1988 when leaders of a military coup suppressed pro-democracy demonstrations and later established a military junta in place of the Government. In 2003, the U.S. Congress passed the Burma Freedom and Democracy Act (BFDA), which was signed into law by the President. The Act banned the import of Burmese products into the United States and the export of financial services from the United States to Burma, which impeded Burma's ability to obtain foreign exchange; the Act also extended visa restrictions on Burmese officials (U.S. Central Intelligence Agency, 2003§, 2004§; U.S. Department of State, 2004§).

Commodity Review

Metals

Copper.—Monywa Copper Project, which is located in west-central Burma approximately 832 km north of Yangon, comprises the following four deposits: Kyisintaung, Letpadaung, Sabetaung, and Sabetaung South. The first phase of the Monywa Copper Project was developed as S&K Mine and consisted of the Kyisintaung, Sabetaung, and Sabetaung South deposits, which are adjacent to one another. The Monywa Copper Project was a joint venture between Ivanhoe Myanmar Holdings Ltd. (IMHL) [a wholly owned subsidiary of Ivanhoe Mines Ltd. (IVN) of Canada (50%)] and the state-owned Mining Enterprise No. 1. Myanmar Ivanhoe Copper Company Limited (Monywa JVCo), which was incorporated in Burma in 1996, operated the S&K open pit mine for IVN. The S&K Mine's ore-processing facilities were originally designed to produce 25,000 metric tons per year (t/yr) of London Metal Exchange (LME) Grade-A cathode copper using heap-leach solvent-extraction electrowinning (SX-EW) technology. By 2003, the annual cathode copper production had increased to an estimated 27,900 t/yr, which was a 12% increase from the original production capacity (table 1). In late 2003, eight additional electrowinning cells were installed at the S&K Mine, which increased the production capacity to 33,000 t/yr (Ivanhoe Mines Ltd., 2004).

In early 2004, Monywa JVCo started in-fill diamond drilling at the Sabetaung deposit. The first phase of the drilling consisted of 28 holes for a total of about 1,800 meter (m). The objectives for the first-phase drilling were to test for potential increases in ore reserves, redefine copper grades, develop a new resource model, and identify potential target areas for future drilling. As of December 31, 2003, estimates of copper resources at the S&K Mine were 205 million metric tons (Mt) with an average grade of 0.37% copper, and at Letpadaung, 1,067 Mt with an average grade of 0.39% copper (Ivanhoe Mines Ltd., 2004).

[1]References that include a section mark (§) are found in the Internet References Cited section.

Gold.—During 2003, IVN Group (the combination of Ivanhoe Corporation and its subsidiaries) retained its 65% interest in the exploration concession of block 10, which is located 150 km southeast of Mandalay, and established a joint venture with the Government of Burma for the project. The joint-venture agreement gave IVN Group the right to conduct exploration activities in the area until August 2004. Early exploration results had identified a belt of quartz gold veins south of block 10 in an area known as Modi Taung in the Nankwe District. Exploration was concentrated in six mesothermal vein systems that contain coarse visible gold. In mid-2003, results were revealed from the study of two mesothermal veins. The Shwesin vein system consisted of a thick sandstone section below the 1,150 m reference level but with dispersed mineralization. Interests were then shifted to a parallel vein system known as Htongyi Taung, which is located 800 m to the east of the Shwesin vein system and which contains continuous but thinner veins in mudstone. The average width of the mineralized vein at the Htongyi Taung is 30 centimeters (cm) at a grade of about 30 grams per metric ton (g/t) gold (Ivanhoe Mines Ltd., 2004).

In March 2003, the IVN Group submitted a feasibility study for joint development of the Modi Taung veins to the Government of Burma. The study proposed the development of a mine in the Htongyi Taung and Shwesin vein areas with an initial production of 75 tons per day (t/d) of ore. The study proposed 11 phases, 7 of which would be at Htongyi Taung. At the time of the proposal, 35 holes had been drilled in the Modi Taung area for a total of 5,385 m (Ivanhoe Mines Ltd., 2004).

The Canadian companies Jet Gold Corp. and Leeward Capital Corp. signed a memorandum of understanding (MOU) in the first quarter of 2003 to participate in the acquisition, exploration, and development of a gold exploration block in a 700-km² area located in northern Shan State. The block is known as the Set Ga Done concession and is located 200 km northeast of Mandalay and 90 km from the border of Yunnan Province in China. Following exploration at the property, a feasibility study was concluded. Each of the Canadian partners will earn 40% interest in the project, and the Government of Burma, 20%. Previous work on this property indicated gold assays of up to 16 g/t gold (Jet Gold Corp., 2003§).

Mineral Fuels

Natural Gas.—According to figures released in 2002 by Burma's state-owned oil company Myanmar Oil and Gas Enterprise (MOGE), the recoverable offshore and onshore natural gas reserves in Burma totaled 51 trillion cubic feet (1.44 trillion cubic meters); additional resources of gas are estimated in the offshore Rakhine area in the Bay of Bengal to be between 13.4 trillion and 47.3 trillion cubic feet (0.38 trillion and 1.3 trillion cubic meters) based upon seismic data. MOGE also reported annual gas production of about 282.5 billion cubic feet (8 billion cubic meters), from which nearly 176.6 billion cubic feet (5 billion cubic meters) were exported annually and earned about $500 million per year. Burma's gasfields and oilfields are concentrated in the areas of Mottama, Rakhine, and Tanintharyi (Alexander's Gas & Oil Connections, 2003b§).

In January 2003, India expressed interest in purchasing gas from Burma's block A1, which is an offshore exploration block located in northern Burma near Sittway in the State of Rakhine. Block A1 was being explored by a joint venture of Daewoo International (Daewoo) from the Republic of Korea, which was the operator of the project (60%), ONGC Videsh Ltd. (ONGC) of India (20%), Gas Authority of India Ltd. (GAIL) (10%), and Korea Gas (KOGAS) (10%). In early 2003, GAIL reported that block A1 had 625 billion cubic meters of recoverable natural gas, which could sustain production for approximately 20 years. GAIL, which had expressed interest in a gas pipeline, analyzed the possibility of transporting the natural gas from block A1 by a 600-kilometer (km)-pipeline network through Bangladesh to India. By the time GAIL announced its interests, a seismic survey had been completed in the area of block A1 (Alexander's Gas & Oil Connections, 2003a§, c§).

In early 2004, Daewoo confirmed the completion of drilling plans for block A1 with a $90 million budget for six appraisal borings and two exploration drillings. The drilling process was expected to be concluded by Summer 2005. To increase natural gas exploration in Burma, Daewoo acquired a new offshore block called block A3. Daewoo held 100% interest in the new asset; exploration programs, including a seismic survey and exploration drilling, were expected to start in late 2004 and early 2005, respectively (Daewoo International, 2004a§, b§).

The Government of Burma granted a new natural-gas exploration contract to Thai PTT Exploration and Production Company (PTT) (a division of PTT Public Company Ltd.) to explore and develop the M7 and M9 blocks in the Gulf of Moattama. The two blocks are located between the Yadana and Yetagun commercial gasfields. Combined gas reserves of the two blocks were estimated to be approximately 5 trillion cubic feet (142 billion cubic meters). The M7 and M9 blocks had combined gas-condensate reserves estimated to be about 7.5 trillion cubic feet (212 billion cubic meters), which were expected to supply gas to powerplants for electricity generation and domestic use in Burma and Thailand. PPT and Burma signed an MOU to develop separation plants in Burma to process gas from the two blocks into natural gas and gas condensate (Oo, 2003b).

Premier Petroleum Myanmar (Premier), which owned a 26.7% stake in the Myanmar's Yetagun gas-condensate production field, pulled out from the project in late 2003. Premier's interest was sold to the remaining production-sharing license partners in the project, which increased their stake in the production venture on a pro-rata basis according to their previous holdings as follows: subsidiaries of Malaysia's Petronas Carigali Sdn. Bhd. (40.9%); Burma's MOGE (20.5%); Thailand's PTT Exploration & Production (19.3%), and Japan's Nippon Oil Co. (19.3%). The production-sharing license in the Yetagun gasfield, which is located in the Gulf of Martaban 400 km south of Yangon, covered blocks M12, M13, and M14. The project covered a total of 24,130 km² and produced approximately 300 million cubic feet per day (8.5 million cubic meters per day) of natural gas and from 8,000 to 9,000 bbl/d of gas condensate (Oil & Gas Journal, 2003; Alexander's Gas & Oil Connections, 2003d§).

Petroleum.—According to 2002 figures released by MOGE, offshore and onshore recoverable reserves of crude oil were estimated to be 3.2 billion barrels. Based on MOGE's data, Burma produced more than 4 million barrels of oil every year but, owing to

shortages caused by the increased demand, increasingly relied on oil imports. MOGE also reported that there were 19 inland oilfields in Burma that were operated by foreign companies from the Bahamas, China, Cyprus, Indonesia, and the United Kingdom (Alexander's Gas & Oil Connections, 2003b§).

In early 2003, Director General U Soe Myint from the Ministry of Energy's Energy Planning Department stated that the state-owned refinery Thanlyin, which is located in the southeastern outskirts of Yangon, had increased gasoline production to about 240,000 gallons per day (Oo, 2003a§). The Thanlyin plant refined the gasoline from gas condensate that was extracted from the offshore Yedagon oilfield and gasfield at a production rate of 73 gallons (1.74 barrels) of gasoline for every 100 gallons (2.4 barrels) of gas condensate processed. The refinery was operated by the Ministry of Energy's Myanma Petroleum Products Enterprise (Oo, 2003a§).

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TABLE 1
BURMA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1999	2000	2001	2002	2003[e]
METALS						
Chromium, chromite, gross weight[e]		3,200	3,000	3,000	3,000	3,000
Copper:						
Mine output, Cu content		26,736	26,711	25,800 [r]	27,500 [r]	27,900
Matte, gross weight[3]		142	125	60 [e]	100 [e]	100
Metal, refined		26,736	26,711	25,800 [r]	27,500 [r]	27,900
Gold, mine output, Au content[e, 3]	kilograms	267 [4]	250	200	200	100
Iron and steel:[e, 3]						
Pig iron		1,500	1,500	1,500	1,500	1,500
Direct-reduced iron		40,000	40,000	40,000	40,000	40,000
Steel, crude		25,000	25,000	25,000	25,000	25,000
Lead						
Mine output, Pb content[e, 5]		1,800	1,200 [3]	900 [3]	900 [r]	500
Metal:						
Refined		1,666	1,054	1,105	1,000 [e]	1,000
Antimonial lead (93% Pb)[3]		65	117	-- [e]	-- [e]	--
Manganese, mine output, Mn content[e]		50	50	50	50	50
Nickel:						
Mine output, Ni content[e]		10	10	10	10	10
Speiss (matte), gross weight[3]		77	60	40 [e]	40 [e]	40
Silver, mine output, Ag content[5]	kilograms	4,168	2,457	1,804	1,500 [e]	1,500
Tin, mine output, Sn content:[5]						
Of tin concentrate		77	149	171	170 [e]	170
Of tin-tungsten concentrate		72	63	41	40 [r, e]	40
Total		149	212	212	210 [r, e]	210
Metal, refined[e]		32 [4]	30	30	30	30
Tungsten, mine output, W content:[5]						
Of tungsten concentrate		3	1	1	-- [e]	--
Of tin-tungsten concentrate		84	73	48	30 [e]	30
Total		87	74	49	30 [e]	30
Zinc, mine output, Zn content[5]		279	437	467	500 [r]	500
INDUSTRIAL MINERALS						
Barite		24,651	30,370	31,015	18,000 [e]	20,000
Cement, hydraulic		338,025	393,355	377,961	400,000 [e]	600,000
Clays:						
Bentonite[3]		998	978	900 [e]	900 [e]	900
Fire clay and fire clay powder[3]		659	331	300 [e]	300 [e]	300
Feldspar[e, 3]		12,000	12,000	10,000	10,000	10,000
Gypsum		44,857	48,067	64,609	113,000 [e]	100,000
Nitrogen, N content of ammonia		64,782	78,000	28,000 [r]	21,000 [r]	62,500
Precious and semiprecious stones:						
Jade	kilograms	2,342,108	8,318,261	8,200,000 [r, e, 3]	10,800,000 [r, e, 3]	11,000,000
Diamond[e]	carats	5	5	5	5	5
Rubies, sapphires, spinel[3]	do.	8,970,441	8,350,695	8,630,000	4,769,511 [r]	4,700,000
Salt[e, 6]	thousand tons	35	35	35	35	35
Stone:						
Dolomite		2,523	166	4,922	3,400 [e]	3,000
Limestone, crushed and broken[e]	thousand tons	2,000	2,400	2,600	3,200	3,000
MINERAL FUELS AND RELATED MATERIALS						
Coal, lignite		40,309	52,811	41,736	57,000 [e]	57,000
Gas, natural:						
Gross[e]	million cubic meters	6,900 [3]	9,400 [3]	9,700	9,400	9,400
Marketed	do.	6,213 [3]	8,477 [3]	8,804	8,500 [e]	8,500

See footnotes at end of table.

TABLE 1--Continued
BURMA: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		1999	2000	2001	2002	2003[e]
MINERAL FUELS AND RELATED MATERIALS--Continued						
Petroleum:						
Crude	thousand 42-gallon barrels	3,394	3,538	4,696	4,920 [e]	5,000
Refinery products[7]	do.	5,605	5,536	5,286	5,500 [e]	5,500

[e]Estimated. [r]Revised. -- Zero.

[1]Table includes data available through September 30, 2004.

[2]In addition to the commodities listed, construction aggregates, sand and gravel, and silica sand are produced, but available information is inadequate to make reliable estimates of output levels.

[3]Data are for fiscal year ending March 31 of the following year.

[4]Reported figure.

[5]Data are for the production by the state-owned mining enterprises under the Ministry of Mines.

[6]Brine salt production, in metric tons, reported by the Government was 1999--61,674; 2000--69,245; 2001--61,466; 2002--60,000 (estimated); and 2003--not available.

[7]Includes diesel, distillate fuel oil, gasoline, jet fuel, kerosene,and residual fuel oil.

Sources: International Fertilizer Industry Association, Ammonia Statistics 2003; Ministry of Mines and Central Statistical Organization (Yangon), Statistical. Yearbook 2001; Myanmar Times & Business Reviews, May 2004; Selected Monthly Economic Indicators, January 2001-February 2002; Asian Mining Yearbook 2000, p. 18; World Bureau of Metal Statistics, July 2004.